MUSES-A

(Reimbursable)

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Launch Date: January 24, 1990
Projected SC Life/DSN Support: 1 year/9 months

Project Responsibility: Institute of Space and Astronautical Science (ISAS)

Source: SIRD April 1989
Sponsor: ISAS

A. MISSION DESCRIPTION

The MUSES-A spacecraft mission objectives are to study the effect of a double lunar swingby technique, lunar orbital insertion, obtain experience using optical navigation equipment, measure mass and momentum of micrometeorids by using a particle dust counter, and to support a packet telemetry and Reed-Solomon coding experiment by using a newly developed fault tolerant onboard computer.

B. FLIGHT PROFILE

MUSES-A was launched on a MU-3II-5 launch vehicle from Kagoshima Space Center (KSC) in Uchinoura, Kagoshima Prefecture, Japan with a launch angle of 79 deg in elevation and 90 deg in azimuth. The burn of the 4th stage motor injects the spacecraft into the mission orbit of 200 km perigee, 350,000 km apogee, and 30 deg inclination. The spacecraft is spun up to 2 rev/s prior to

injection. After separation, the RCS maneuver was performed reducing the spin rate to 20 rev/min. Prior to the first swingby maneuver a tiny satellite (12 kg), which is carried aloft on the top of the main spacecraft, was injected into lunar orbit.

C. COVERAGE

No DSN launch vehicle support was required. The DSN will support the Mission phase only.

1. Coverage Goals

The DSN supports the Mission phase, providing downlink telemetry recording at all stations until one of the stations completes its second contact with the spacecraft. The DSN also provides radiometric data acquisition and orbit determination for each lunar swingby maneuver. This will involve five or six passes of about 6 hours duration. There is no requirement for DSN commanding.

2. Network Support

The support provided by the DSN is indicated in the following table:

System	Goldstone	Canberra	Madrid
	12 14 15 16	42 43 45 46	61 63 65 66
S-band TLM	P	P	P
S-band CMD	N/A	N/A	N/A
S-band TRK	P	P	P

NOTES: P = Prime
B = Backup

D. FREQUENCY ASSIGNMENTS

Frequencies are allocated according to the following table:

System	Uplink (MHz)	Downlink (MHz)	Polarization
S-band TLM	N/A	2259.9	RCP
S-band CMD	N/A	N/A	N/A
S-band TRK	2081.0	2259.9	RCP

E. SUPPORT PARAMETERS

The support parameters for the Telemetry, Command, and Support Systems are listed below:

(1) Telemetry

Data Streams	1
Format	PCM (NRZ-S)/BiØ/PM or PCM (NRZ-S)PSK/PM
Subcarrier Frequency	8192 Hz (256 b/s)
Bit Rates	256, 2048, and 8192 b/s
Record	Required

(2) Command

Format	PCM (PN/BiØ)PSK/PM
Subcarrier Frequency	8000 Hz
Bit Rate	1000 Hz

(3) Support

Uplink Power	1 to 10 kw
Antenna Rate	Moderate
Antenna Angle Data	Required
Antenna Autotrack	Required (26-m only)
Doppler Rates	Modest
Range Formats	Tone (Prime) (500 kHz Major Tone) DSN Standard (Backup)
Recording	
. Analog	Required
. Digital	Required

F. TRACKING SUPPORT RESPONSIBILITY

The allocation of responsibilities for tracking support is listed in the following table:

Mission Phase	Support Responsibility
Prelaunch	ISAS
Launch	ISAS
Mission	DSN, ISAS

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